Honors Chemistry - Atomic Structure & Energy of Electrons Problem Set

Stasya

1. How many grams of zinc are in 5.67 moles?

2. How many moles of nickel are equal to 2.04×10^{-4} grams?

3. What is the frequency of radiation that has a wavelength of 3.33×10^{-8} m? If only radiation with wavelengths between 400 and 700 nm are visible, is this visible radiation?

4. In order to eject one mole of photos from gaseous cesium atoms 382 kJ of energy is absorbed. Calculate the wavelength associated with this energy.

5. Only two isotopes of copper occur naturally. ^{63}Cu (mass = 62.9298 amu; abundance 69.09%) and ^{65}Cu (mass = 64.9278 amu; abundance 30.91%). Calculate the average atomic mass of copper.

6. Naturally occurring chlorine is 75.53 percent ^{35}Cl which has an atomic mass of 34.969 amu, and 24.47 percent ^{37}Cl which has an atomic mass of 36.966 amu. Calculate the average atomic mass.

7. Would an electron have to absorb or release energy to jump from the second energy level to the third energy level?

8. What does the number 14 represent in C-14?

9. What is the shorthand electron configuration of cesium?

10. Which has a longer wavelength - the light with a frequency of 7.32×10^{14} Hz or a light with a frequency of 6.0×10^{14} Hz? Why?

11. Which ancient Greek philosopher was the first to believe that matter was made up of atoms?

12. List the five parts of Dalton's Atomic Theory. If it is still considered true, write true next to the part.

13. What was J.J. Thomson's major discovery?

14. What was Ernest Rutherford's major discovery?

15. What particular isotope was used to define the "mole" concept?

16. What are the names of the three isotopes of hydrogen?

17. What is the energy of one mole of photons of green light whose frequency is 5.80×10^{14}?

18. Calculate the average atomic mass given the following information about silicon's isotopes: Si-28's percentage is 92.23%, Si-29's percentage is 4.67%, and Si-30's percentage is 3.10%.

19. Draw the lewis structure of Xe.

20. How many neutrons does the most common isotope of hydrogen have?

21. What happens when an atoms forms a cation?

22. Ne, Ar, Kr, and Xe have how many valence electrons?

23. Calculate the number of moles in 7.9 milligrams of calcium.

24. When white light is viewed through sodium vapor in a spectroscope, the spectrum is continuous except for a dark line at 589 nm where the sodium electrons absorb energy. What is the amount of energy absorbed at this wavelength?

25. Write the element scandium using the super/sub method.